

RESOURCE LIBRARY
ACTIVITY : 45 MINS

Hunters in the Air

Students examine characteristics of pterosaurs as they evolved over millions of years and consider how these adaptations made pterosaurs effective hunters and survivors.

GRADES

3 - 5

SUBJECTS

Biology, Geology

CONTENTS

4 Images, 2 Videos, 1 PDF

OVERVIEW

Students examine characteristics of pterosaurs as they evolved over millions of years and consider how these adaptations made pterosaurs effective hunters and survivors.

For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/hunters-in-the-air/>

Program



DIRECTIONS

1. Build background about prehistoric time.

Help students think about prehistoric time periods. Ask: *Do you know when the dinosaurs roamed the Earth? Was it hundreds of years ago, or more? What was happening in the world*

one hundred years ago? (More; hundreds of years ago people invented cars, trains, and airplanes.) *Thousands of years ago or more?* (No; thousands of years ago people built pyramids, began to farm the land and build civilizations.) Explain that millions of years ago (mya) reptiles such as dinosaurs lived on Earth, long before people. Have students share their ideas of what the world was like millions of years ago. Display the image of the pterosaur fossil and have students describe what they see. Explain that scientists called paleontologists analyze fossils to determine characteristics of these living things, including when they lived.

2. Discuss how living things change over time.

Show students the photo gallery image of the *Dimorphodon*, which lived 200 mya, and the *Quetzalcoatlus*, which lived 71 mya. Ask students to talk in pairs about the differences between these two pterosaurs. Have them share their observations. Explain that paleontologists know from studying both fossils and living things today that living things change, or adapt, over time. Ask: *Can scientists study pterosaurs today? How?* Students' answers will vary. Lead the discussion and help students conclude that today paleontologists cannot study pterosaurs directly, but they can study their fossils. Help students understand that at one time there were no pterosaurs, and then they appeared and flew through the air. Ask: *How did they appear?* Explain that scientists believe they evolved from reptiles that walked on Earth. Then ask: *Why did pterosaurs start to fly?* Explain that together the class will discover the answer to the question.

3. Have students discover and discuss why pterosaurs flew.

Explain that it is clear from fossil evidence that there was an abundance of flying insects on Earth when pterosaurs lived. Even before pterosaurs, flying insects would have been important to reptiles on the ground. Ask: *What do all of these insects in the air mean for the reptiles down on the ground?* (The insects could be food for them, and the reptiles need to be able to catch them.) *How could the reptiles get to the insects?* (They could jump, climb trees, or try to fly.) Many scientists believe that the hungry reptiles climbed trees to hunt for insects. Have students think about what parts of the pterosaur's body changed over time and why as they watch the video "Flying Monsters: From Reptiles to Pterosaurs." Ask students to share their observations. Then, explain that these reptiles developed membranes between their limbs and torso. These wings are an example of an adaptation: a body part that changes over time and generations, which helps species survive. Over millions of years, the wings changed shape, the bodies changed shape, and the pterosaurs flew.

4. Find information about pterosaur characteristics.

Give each student a copy of the worksheet Pterosaur Observations and read the instructions together. Explain that students will look for information to help complete the chart using the video clip “Flying Monsters: An Introduction” and the website “Flying Monsters: Meet the Monsters.” Fill in information about *Dimorphodon*’s characteristics together as a class. Have students work individually or in small groups to complete the chart with information about *Tapejara*’s and *Quetzalcoatlus*’ characteristics. Ask: *Which adaptations do you think helped each pterosaur to fly? Which adaptations contributed to feeding and hunting behaviors?*

5. Have students explain what adaptations are and why they happen.

Help students understand the concept of adaptations. Ask students to use the information they collected in the chart. Ask: *What did Dimorphodon, Darwinopterus, and Quetzalcoatlus need to do to survive over millions of years? (avoid predators, hunt for food, move, reproduce) Which body parts changed? How did those changes help the pterosaurs?* Record students’ responses on the board. Discuss how over millions of years, the shapes of pterosaurs’ body parts changed. These adaptations helped pterosaurs change flight styles and hunting techniques over time. Adaptations can also help a living thing protect itself from predators or find a mate.

Modification

Project the [Prehistoric Time Line](#) to take students back to the Mesozoic era when dinosaurs and pterosaurs lived. Have students look at the timeline and name the three periods of the Mesozoic Era: Triassic, Jurassic, and Cretaceous. Discuss where pterosaurs would fit on the timeline. Fossil evidence shows they first appeared 215 mya and died out 65 mya. What else lived on Earth at this time?

Informal Assessment

Students should see that pterosaurs became more graceful flyers over time, flying farther distances. Later pterosaurs, such as *Quetzalcoatlus*, had wider wingspans and smaller heads than the early *Dimorphodon*. Their long, toothless beaks helped them snatch small animals as prey. They became much better hunters in the air.

Extending the Learning

Play adaptation charades. Have students list adaptations on slips of paper. Divide into teams and act out the adaptations. Possibilities include long toothless bill, long tail, short tail, large skull crest, wide wingspan, short wingspan, heavy body, light body, thin wing membrane,

strong arm bone, long fourth finger, long skull, membrane between legs, and large brain. Give students extra points if they can name a pterosaur with each characteristic demonstrated.

OBJECTIVES

Subjects & Disciplines

Biology

Earth Science

- Geology

Learning Objectives

Students will:

- explain the term
- explain how adaptations helped pterosaurs succeed as flying hunters

Teaching Approach

- Learning-for-use

Teaching Methods

- Discussions
- Multimedia instruction
- Reflection
- Visual instruction

Skills Summary

This activity targets the following skills:

- Critical Thinking Skills
 - Evaluating

- Remembering
- Understanding

National Standards, Principles, and Practices

NATIONAL SCIENCE EDUCATION STANDARDS

- (5-8) Standard C-5:

Diversity and adaptations of organisms

- (K-4) Standard C-1:

The characteristics of organisms

Preparation

What You'll Need

MATERIALS YOU PROVIDE

- Paper
- Pencils

REQUIRED TECHNOLOGY

- Internet Access: Required
- Tech Setup: 1 computer per classroom, Projector, Speakers
- Plug-Ins: Flash

PHYSICAL SPACE

- Classroom

GROUPING

- Large-group instruction

BACKGROUND & VOCABULARY

Background Information

Pterosaurs were flying reptiles that may have evolved from insect-seeking lizards. Earliest fossil evidence of pterosaurs dates back 215 million years (mya) ago up until 65 mya. During their 150 million year existence, these animals changed drastically in size, body, shape, and flying ability.

Prior Knowledge

Recommended Prior Activities

- None

Vocabulary

Term	Part of Speech	Definition
adaptation	<i>noun</i>	a modification of an organism or its parts that makes it more fit for existence. An adaptation is passed from generation to generation.
fossil	<i>noun</i>	remnant, impression, or trace of an ancient organism.
paleontologist	<i>noun</i>	person who studies fossils and life from early geologic periods.

For Further Exploration

Websites

- [National Geographic Entertainment: Flying Monsters 3D](#)

